

EFFECTS OF PRENATAL AND POSTNATAL EXPOSURE TO CHLORDECONE ON INFANT NEURODEVELOPMENT

Renée Dallaire, CHUQ Medical Research and Laval University, 2875 boul. Laurier, 6th Floor, Édifice Delta 2, room 600, Québec City (Québec), Canada, renee.dallaire@crchul.ulaval.ca

Gina Muckle, CHUQ Medical Research and Laval University, Canada

Florence Rouget, National Institute for Health and Medical Research (INSERM) and Université Rennes I, France

Sophie Seurin, Agence Nationale de Sécurité Sanitaire (ANSES), France

Christine Monfort, National Institute for Health and Medical Research (INSERM) and Université Rennes I, France

Luc Multigner, National Institute for Health and Medical Research (INSERM) and Université Rennes I, France

Henri Bataille, CHU Pointe à Pitre, Guadeloupe

Philippe Kadhel, CHU Pointe à Pitre, Guadeloupe

Jean Pierre Thomé, Liege University, Belgium

Sandra W. Jacobson, Wayne State University, USA

Olivier Boucher, CHUQ Medical Research and Laval University, Canada

Sylvaine Cordier, National Institute for Health and Medical Research (INSERM) and Université Rennes I, France

Background and Aims: The estrogenic insecticide chlordane was extensively used from 1973 to 1993 in the French West Indies, to control banana root borer. Its persistence in soils has led to the widespread pollution of the environment including tap water sources and crops. Chlordane was shown to have neurological effects in humans such as tremor, ataxia, oculomotor dysfunctions and memory loss. Thus, the aim of the study was to evaluate the impact of prenatal and postnatal exposure to chlordane on the neurodevelopment of 7-month-old infants from Guadeloupe.

Methods: Umbilical cord blood samples (n=169) were collected from newborns and analyzed for chlordane concentrations (mean = 0.58 ng/L). Infants were tested at 7 months. Visual recognition memory and speed of processing visual information into memory were assessed with the Fagan Tests of Infant Intelligence (FTII), visual acuity with the Teller Acuity Card test and fine motor development with the Brunet Lezine. A maternal interview was conducted to document infant health, diet and family situation. Chlordane concentrations were quantified in breast milk. Postnatal exposure was determined through frequency of contaminated food consumption by the infants.

Results: In adjusted models, cord chlordane concentrations in tertile were associated with reduced novelty preference on the FTII in the highly exposed group ($\beta=-0.22$, $p=0.005$), as was consumption of contaminated food ($\beta=-0.15$, $p=0.038$). Postnatal exposure through contaminated food consumption was also related to longer time to process visual information ($\beta=0.18$, $p=0.045$). Detectable levels of chlordane in cord blood were associated with higher risk of having a score below the third percentile on the fine motor development scale (OR=1.27, $p=0.002$). Chlordane in breast milk was not associated with neurodevelopment scores.

Conclusion: These results suggest that pre- and postnatal low chronic exposure to chlordane is associated with deleterious effects on several domains of neurodevelopment during infancy.